

Inaugural Dissertation
 On
 The Proximate Causes of
 Febrile Reactions.

Now ex causis, nec ex sede morborum, ad
 eorum Symptomata; sed ex symptomatibus ad
 sedem causasque morborum est procedendum,
 talique progredi patet medicus.

Lanuaque.

By J Mitchell

admitted Mar 4 1819

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Part First.

From the earliest periods of medical record, man appears to have been attracted by the peculiar and interesting phenomena of animal life. — They saw, as they supposed, a self-moving machine, and sought in itself a solution of the questions concerning its nature. — The earliest notions therefore of animal life & action, consisted in the belief, that it is derived from some internal moving principle capable of action without external impulse. — Once established, this popular opinion maintained an ascendancy, amidst conflicting systems and theories, down to a very recent period. — The *Trochæus* of Hippocrates, the *Nature* of Sydenham, the *Archæus* of Van Helmont, the *Vitæ Medicatrix Natura* of Paracelsus, the *æthereo-medica* of Stahl, & *Nichols*, and the *Impetum Faciens* of Haanen Boerhaave, sufficiently attest the belief of these writers that the animal machine is self-moving. —

Book 10

The first of these is the
 nature of the soul, which is
 said to be immortal and
 indivisible. It is also said
 to be simple, without parts,
 and to be the source of all
 life and motion. The second
 is the nature of the body,
 which is said to be mortal
 and divisible. It is also said
 to be composed of four
 elements, earth, water, air,
 and fire. The third is the
 nature of the senses, which
 are said to be the means
 by which the soul perceives
 the world. The fourth is the
 nature of the passions, which
 are said to be the motions
 of the soul in response to
 the objects of the senses. The
 fifth is the nature of the
 intellect, which is said to be
 the highest part of the soul,
 capable of understanding
 the truth. The sixth is the
 nature of the will, which is
 said to be the power by which
 the soul chooses between
 different courses of action.

Book 11

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 different courses of action.

It is not therefore to be wondered at, that the theories of the causes and nature of febrile diseases, assumed their opinion as their basis, and founded upon it their superstructures. — The writings of Stahl, Hoffman, Boerhaave, & Cullen, all attribute the principal phenomena of disease to this mysterious power, and draw from it an elucidation of their respective theories.

All these fine "frost works of fancy", have, now by now, been consigned to forgetfulness; and, of the numerous expositions of febrile action derived from the doctrine of an interval moving principle, that of Dr William Cullen alone remains; and it also, but for the more useful discoveries of its author, would have perished with the rest. —

Dr Cullen's Theory.

Too much more better calculated to establish an innovation than Dr Cullen. — Learned, laborious, zealous, and observant, he was, altho distinguished for

the originality of his conceptions, and for the power and
 address displayed in their development. — In addition
 to all this, he was at the head of the greatest medi-
 cal seminary in the world; where he enjoyed an oppor-
 tunity of exhibiting his opinions to minds nearly in-
 capable of resisting the influence of reputation & of dis-
 guise. — The excellence too of his practical precepts,
 resulting from patient observation, was an slender sup-
 port to the theory with which they were interwoven. —

This celebrated theory is too well known to require
 other details or repetition. — It leaves all febrile dis-
 eases to a diminution of the energy of the brain, by
 which the cold stage of fever is induced. — It sup-
 poses that the Vit Medicatrix Naturæ causes a
 spasmodic contraction of the cutaneous organs, and
 a consequent reaction to overcome that spasm, for
 the purpose of restoring to the system its equilibrium. —

This very contrary view of a theory, exhibited by its
 promulgator with the most imposing accompaniments,
 is sufficient to prove, that not one single step, in

the whole process.
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the whole process of reasoning, is taken without an hypothesis. — The inconsistency of the opinion that stony and spasm exists in the same vessels at the same time; the absurdity of supposing that mechanical impulses can produce secretory action; and that the retrocession of circulation caused by a want of energy in the brain should be abated by the his medicamina naturales, precursors to the recovery of that energy; all render the task of refutation unnecessary. —

Notwithstanding the palpable absurdity of this famous theory, it became the fashionable dogma of the day, and reigned triumphant in the highest medical schools. — When therefore, Brown, in that daring spirit of innovation, characteristic of his genius, transpired this splendid fabric in the dust, ~~the~~ and erecting upon its ruins his simpler & imposing system, the minds of men, transpired by the errors of education, and the fetters of authority, gazed in doubtful astonishment upon the havoc he had made, and upon the wide & novel views presented to their imagi-

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either line line. Whenever the line cut across is the
not just under 1. In this, there is one point at which
the probability was it will be so perfect as to
each other as to constitute the condition of the
facts. All other proportions, however, a certain
limit, was sufficient to constitute the condition

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not been.

Attention was in 1822, 23, 24, to an accumulation of excitability during the absence of stimulation in the absolute state.

This is a very curious instance of lost adjusted theory, under which the distance connected with an internal self-motion, ^{being} gradually so changed, notwithstanding the important support which has been derived from the labile condition of action.

But in spite of its identity & constancy, the theory of Force is liable to many interesting variations. The author has committed a great error, in saying that what he calls lost excitability, in which the excitability shown by him, as the spring of the same subject, is an accumulation of excitability is perceptible, only in that organ from which the excitability has been gradually so latently abstracted while the organ immediately affected, did not contain similar but that which they appear, as cases of interest

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It follows therefore, that, not less a disease, but
produced by exhaustion or debilitation, the real source
of pain is immediately affected is that of cohesiveness.
It also follows, that cohesiveness is in a little the seat
of a continuation of cohesiveness, in the one case, as
in the other; in the one, the production of
an exhausted or diminished cohesiveness in the heart
and vessels, which can be best called, of course, the
primary seat of febrile diseases. Besides, not
nothing (Provisional notions of indirect & direct liberty,
I feel totally at a loss, upon his principles, to under-
stand the mode in which an accumulation of
cohesiveness can take place, in the heart & vessels,
while the heart, the natural stimulus of these
parts, is always present. The existence of a contin-
uation of cohesiveness, in the case of a disease, is to
under the direction of the natural source of cohesiveness
disease, as it is not in a continuation of

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variability is the effect of their disease is temporary,
and therefore we are bound to abstain such to take
place in the next, while the heart is there, and
then without a further cause. In the case of
fever, we are bound to look for another explanation of the
cause of the disease, and to find that the cause is not
apparent in the agents of the singular phenomenon.

Wilson's Theory.

Wilson's theory is the theory of the
fever, and is based on the substitution of another,
more in perfect to have more consistent,
and to have better explained the changes which
take place during fever.

The disease, the animal, and the
into two great classes of questions. The first is
the second, including those, commonly called as follows,
in the former expression. He denies that the
new substitution or change of the animal, and the

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If the reaction ever occurs, the following is the first
movement of the system, the system is the first to be affected
and action has all the time, but if not,
the pressure is the first to be affected,
and soon the first to be affected
and left, death must finally occur.

The same is to be seen in the case of the reaction
and the first to be affected is the first to be affected
the interruption of the secondary operations is
the same time.

The first to be affected is the first to be affected
the action, that is, the interruption of the action, the
action is the first to be affected, and the reaction, the
of which is the first to be affected is the first to be affected.

The first to be affected is the first to be affected
the first to be affected, and submitted to the same
stimulation: whereas, the behavior of the first and
last is the first to be affected is the first to be affected
of the first to be affected is the first to be affected — There is

most prominent symptoms in this disease, considered as it was not of itself the mode in which the vessel and adjacent organs. Some authors, however, consider both vessels; they have not a portion of constitutively, and in some the opposite is the case. In some a juster explanation must be applied, but in some.

Upon the main theory, the theory of Maudsley, with its still apparent plausibility, is founded upon a supposition, and is not an adequate explanation of febrile phenomena.

(Stutterbuck's Theory)

The last theory, of which I have taken notice, is that of Stutterbuck.

The author refers the febrile increase to a local inflammation of the meninges as their primary seat. His arguments are summarily following.

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1st The animal functions, to wit, sensation and voluntary motion and likewise the process of the mind, is in which spirit immediately acts on the brain, and vary with every variation in the state of the body, more steadily and greatly than any of the other functions.

2^d The vital functions, to wit, respiration & circulation are not so immediately dependent upon the brain, and are therefore more liable to some disorderous derangement. The state of circulation and respiration is therefore more steady, sometimes it is altered. Hence, the primary seat of disease is not the brain, even in the case of apoplexy, for in many cases of that disease, the intellect and abstract nature of the functions is a great deal less interrupted.

3^d The irregularity of the action of the vital functions than there is in sensation & motion. The state of the brain is more steady, as a rule of power, but

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an injection of the stomach *per se*, could occasion
 no symptoms as food etc. is not p^ro, nor must it
 but the immediate cause of apoplexy is fever
 All these are manifestly affections of the brain
 and its functions. "Hence, that the function of
 the stomach is commonly disorder'd in fever, the
 same is more especially true of the functions of the
 stomach, as it is more than any other part of the
 system, in this disease. We therefore shal-
 low the same to, for may we not be supposed
 the primary cause of the disturbance advanced
 in the functions of the stomach in fever, is the
 reverse, and this, I have no doubt, is actually the
 case."

- 13) The alteration of fever with inflammation: the
 analogy between fever and inflammation, is requir'd
 to be in some, and precisely the opposite, and the
 resemblance between fever and inflammation, is not
 in the argument.

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87: And his gift is almost gone this morning
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into an important part in most critical diseases; and his own conservative renders it a competitor with the brain for the exercise of reason. The state of the brain in a great many critical diseases, operating badly; the experiments of Dr. Moreau & L. Ferri; the study of anatomy of the circulatory system upon the brain; the rising importance of the spinal marrow in medical studies; and the close & immediate connection between the structure of circulatory system, and the various diseases for affecting the theory of bilobularism. And for supposing that, although the brain may be sometimes an active agent in the extension of disorder, it is but in part of a mind, system of intellect. It is to be benefited in general of morbid impurities, and of morbid, almost its departure is confined to impurities, or life, and can disorder upon the fabric to me. If they belong.



Part Second.

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2. *Neurobora*

Young thus insinuates, and to me, perhaps, more than to any other man, the most serious of faults, because it is the least pardonable, that he is not content with the known phenomenon as he is, but is bent to give a new form, which will be more perfect, after which these phenomena than any other he is entitled to give, and that known mind has no more to be given. He says it cannot be done, because it is already done. He would lead to any possible result, and, on the other hand, make the ground to explain, if that possible mind is given, is delighted by the most enlightened men of the profession.

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path of the deflection and without any loss, either
 due to resistance, or to any other cause. It may be as foreign
 to my present purpose, to enquire, by what parts of
 the nervous system, this operation is executed, or
 what is the process, or the nature of its operation. I have
 been told, by writers upon these subjects, that
 this time is not given to suppose, that the
 nervous system does not alone compose this operation.
 but that there is also some sort of force, or
 matter, which is important parts of the nervous
 system. I believe, however, that the nature
 of this substance is unknown, which has
 led to the present state of many opinions. In
 fact, it is only in the external parts of the
 body, and even the nature of that part, is
 almost unknown. I believe, however, that
 foreign agents, both mechanical and
 with the external nervous system. I believe,

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and the various measures at the present time, have
 been and will be, the more and more
 to agents, which do not interfere by any means
 matters, or are not permitted to keep the matter
 to these places.

It is therefore long in these few columns, with
 which important matters are found in the com-
 munity of the world, and thus, the study of
 something like with surrounding events, has opened
 an avenue, through which, whatever improvement
 can be made in social science, and in respect to
 the whole world, and the future.

Of the two before mentioned as above,
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the one, and the other, are not
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character of the stimuli used, is not always
 the best produced in the common sense, it has
 not been, although usually, so joined to them, from
 habit, as experiments, the state of the nervous
 system, & excitability of the organ, may be mostly
 different. Then, my impression is, as regards the
 sound, the ordinary stimuli do not produce the
 ordinary sound of the organ. But, when a greater
 stimulus is used, at some concentration, but from
 distraction of the nervous stimulus, the excitation
 of that stimulus produces an unusually great
 sound. If however large changes are sufficiently
 permitted to communicate changes to other organs,
 the ear is less other organs, in both cases,
 is sensitive to the operation of their excitability.
 There may be the cause of repeated action in
 the organ, usually excited, and whatever may
 be the quantity of excitability in that organ,

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the organs secondarily affected are always in an exhausted condition, and respond less forcibly to the operation of their natural stimuli. The same is an example of this in cases of convulsions. Thus the effect of food upon the stomach is most violent, whilst light produces hardly any effect upon the eye, or warmth any effect upon the hand. The eye & hand are as little able to co-operate of their stimuli as if their essential condition had been produced by an exhaustion of the excitability of the stomach.

When therefore the palsy of the cause or the insensibility of the organ, control the tendency of the system, or the system, then that one or more, must be in that condition in which the usual stimuli do not produce the natural action. When as communicated by electricity has never been known to take place in any organ, whilst the cause in which it was administered still operates, and

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while the morbid stimulus of the organ is present,
 we are left without any good reason for admitting
 accumulation of irritability in the heart & ar-
 teries to be the proximate cause of fibrillation.
 While the agent of debility continues to operate
 upon the external organ, and moves that organ
 maintains its connexion with the system, the parts
 over which it has flung its stream, must still
 feel the influence of its spelt. — We vain therefore
 shall we look for reaction in the heart & arteries,
 if we wait for the accumulation of coagulability,
 to render them sensible to the ordinary stimulus
 of arterial blood. — Nothing but a cessation, or
 diminution of the operation of the morbid cause,
 could attain such an accumulation; and the
 very phenomena of reaction show, that the com-
 mencement of this salutary process is at a
 point far removed, from the primary seat of disease.

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(I) joined this of this principle theory of action, we are left without any good explanation of this mysterious property: and must resort to the symptoms for an illustration of its nature & its seat.

The immediate cause of the debility ad remota is the commencement of febrile disease, is a want of susceptibility to the operation of stimuli. Reaction must therefore be produced by an increase of susceptibility, or of stimulus. We have already seen that there exists an increase of susceptibility, at least by means of some stimulus, but we are therefore constrained to look for the cause of reaction in those means by which susceptibility may be increased, or the power of stimuli rendered greater.



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As the blood has almost entirely left the minute vessels,
the quantity contained in the great vessels is necessarily
great, and must cause a great distension of the vessels.
This distension was then dependent on the pressure exerted
by the blood, & the pressure of the air.

But the pressure of the air, as we have seen, is not the
cause of the distension. 1st It remains to be proved
that such distension does not exist in a vacuum, & that
the heart does not contract. 2^d Something that it does not
operate, like all other muscular stimuli, its tendency
would be towards greater contraction. 3^d As the
motion of the external action was not sufficient to
distend the muscular system, it must not be sufficient
to contract it. 4th The gradual accumulation
of the blood in the large vessels, may make some im-
pression upon the vessels, which are immediately de-
pendent upon the action of the heart & larger arteries,
but whether it can force the blood beyond that point
in the vascular system into which this action usually
stops it, and cause a greater motion, is a point

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in the capitulation of independent agencies as present
 tendency to be receding. It is the cessation of the
 action of these agencies, which causes the cessation
 of the great effects, and they cannot regain their
 destination beyond their power of reaction or reaction.

We are at length constrained to vote for the cause
 of reaction, not on any agent operations upon the
 existing excitability, and their tendency, stimulus to
 exhaust it, not on an accumulation of excitability,
 during the action of that cause, by which it was
 diminished, but to some power, by which a new
 or increased production of excitability is supplied,
 he takes the place of that which has been at-
 tached by the morbid agent.

Reaction is the cause of the change of action
 on various points, and reaction is a capitulation action,
 which has sufficient connection in the general action
 the consequence, that change must be left completely
 man, having the next stage of fever, and the blood.

1. on the basis of reaction & the blood.

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most from from the exterior into the veins in an indirect
manner. In this condition, it is not in the lungs, but
separated from the atmosphere, and opening by a very small
pneumotic membrane, it discharges its contents as soon as it
touches the interior of the pulmonary artery into the
right ventricle. The nature of this action, and its location
is now lost. The minute surrounding capillary vessels
being in the lungs, it is separated by the pressure of these
vessels, and not a small portion of it is carried to the
arteries, and is not at the same time so exposed
as to enter into the same that waste part. Each
descending circulation presents to the lungs a left ventricle
first. The surrounding circulation first, it is in part from
of a higher degree of that positive quality by which
parts in contact with it appear to be imbued with
constituted. And though nearly the same in nature, and
both in the arteries and veins, is highly arterial, and
parts, seldom subjected, to the constitutive agency of this
to be placed, and yet it is with an unusual quantity,

[illegible]

[Faint handwritten notes, mostly illegible.]

It has in the interim the sense the organs of respiration, & are supplied by blood passing, & are incessant signs, the power of developing, if not of nourishing, is established. Again by degrees the susceptibility to the influence of histological elements returns, and is after increased to a moderate degree. In this increased susceptibility returns the power of relation and the functions of the system are performed with even more than common activity. The heart beats more vigorously; caldness departs, heat succeeds; the colour of the skin returns, & becomes unusually great. - After a time a mass now appears upon the forehead, accumulates, & as sweat, & gradually extends itself over the whole body; exhibiting evidence, that the secretory action of the system has been restored.

By this restoration, and increase of secretory action, the natural proportion between

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dearth of action and secretion is restored, and the blood in the veins presents a normal appearance, indication of the abstraction of its less potent qualities.

This is the course of an Intermittent Fever. The subsidence of action again presents a field for the operation of the morbid agent, which again produces the same round of symptoms.

But the disease may be so great as to transcend the secretory power, and thus prevent the restoration of an equilibrium between deconstruction and secretion. — In such cases, a ^{continued} ~~simple~~ Inflammatory Fever is the consequence.

The same effect is produced, when the power of the exciting cause is so great as to hold the vessels of circulation in subjection, in spite of the stimulating sanguineous influence.

In such cases, likewise, the powers of life

[Faint handwritten notes, mostly illegible]

must soon wear themselves out, and offer but a feeble resistance to the encroachments of the morbid power of debility of a most dangerous kind must soon succeed. - This kind of fever has been denominated Typhoid by Dr. Keil.

Even from their very commencement, some fevers are characterised by unusual prostration, and apparent debility of the powers of life. In such cases, the morbid impression seems to triumph over the reaction energy, and to oppose or resist life influence to the efforts of restoration. An irregular and feebler action indicates the struggle between stimulation and impression; and exhibits deplorable evidence of the existence of Typhoid Fever.

From our own train of reasoning, it appears, that reaction is, at least in a great measure, the effect of a want of due propor-

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tion between the secretory and putrefactive action
 is an entirely healthy condition, and if
 by any chance, the secretory should so acquire
 a morbid influence, which involves the rest
 of the system, active secretion then action, no
 reaction can be expected nor any powerful
 counteraction of disease. It is certainly true
 find, that some of the most fatal maladies on
 record have been accompanied by cutaneous
 discharges. x

Strange as it may appear, even the res-
 piratory system may escape the effects of a poison
 which is destroying the vitality of the rest of the
 machine, and, while the patient is fast approach-
 ing to the termination of his cancer, his pulse
 and skin may afford us no intimation of his
 danger. - Authors of experience have therefore
 warned us to beware of a natural pulse &
 rose skin, under such circumstances. -
 "Hartley's & the report done." - "See Heng's Hist."

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we can easily see the propriety of this action, as an agent of motion except the blood is human, and, as it has not undergone any change, it cannot offer a counteracting influence to the effects of the morbid stimulus.

Hence, the nature and phenomenon of pain may be infinitely diversified, according to the proportion between the morbid agent, & the powers of life, the importance & numerous of the stimulus, & the nature of the function so excited, the nature of the morbid impression, and the constitution of the surrounding atmosphere. Indeed there is not one single case of generalised & direct impact, namely, described by authors, which may not be suitably accounted for, according to the foregoing theory.

As to the theories on Spasms in this, that they seem to consider the secretory organs as obedient to the action of the vital stimulus,

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they continually recur to chemical & mechanical principles for the illustration of vital actions, and suppose, that a set of vessels performing a wonderful variety of living operations, can be made to produce the same effects, by becoming simple mechanical tubes, and submitting to one single mechanical power. All of them are in one remarkable point, that, while they admit the diminution of susceptibility over the whole system, they only propose such agents of reaction as would tend to a still greater diminution; whereas it is evident enough, in most cases of fever, that the susceptibility of the whole system is increased. — We are therefore forcibly led to the conclusion that the agents of reaction are, productive of an increase of the power of excitability; and we hope we have shown

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satisfactorily, that the changes produced upon
the blood, during the stage of debility, are
sufficient to cause all the phenomena of
reaction, and to explain them upon pathologi-
cal principles, independently of the laws of
mechanics and of chemistry.

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